

The `makebase` $\text{\LaTeX} 2_{\epsilon}$ package*

Typeset counters in a different base

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Summary

This package typesets a \LaTeX counter such as `page` in an arbitrary base (default 16). It does not change font or typeface.

The package extends the functionality of the existing `hex \text{\LaTeX}2.09` package and provides documentation. However, the author is not a mathematician, and suggestions for rewriting the code are welcomed.

Warning: this is alpha software and may contain bugs. Please report problems to the author.

*This document corresponds to `makebase v. 0.2 α` , dated 2016/05/10.

Contents

1	Description	3
2	Implementation	4
2.1	Packages required for the package itself	4
2.2	Counters	4
2.3	Macros	4
A	Test of package	8
B	The L^AT_EX Project Public License	9
B.1	Preamble	9
B.2	Definitions	9
B.3	Conditions on Distribution and Modification	10
B.4	No Warranty	13
B.5	Maintenance of The Work	13
B.6	Whether and How to Distribute Works under This License	15
B.6.1	Choosing This License or Another License	15
B.6.2	A Recommendation on Modification Without Distribution	15
B.6.3	How to Use This License	15
B.6.4	Derived Works That Are Not Replacements	16
B.6.5	Important Recommendations	17
B.6.5.1	Defining What Constitutes the Work	17
	Change History	18
	Index	19

1 Description

This package was developed for an application which typeset smoke proofs of font characters from the Private Use areas of Unicode, where the codepoint is a very large number usually expressed in hexadecimal, and this was required for the page numbers.

The package contains two macros:

1. `\Sil@MB@maxdiv` finds the highest power of the selected base which is smaller than the value of the counter and makes it the primary divisor;
2. `\makebase` divides the counter repeatedly by the divisor found in `\Sil@MB@maxdiv`, reducing it by one power each time, and outputting the quotient as a digit.

This has only been tested in page numbering so far (see the accompanying file `makebase-test.tex`, for example:

```
\setcounter{page}{57635}
\makebase{page}
```

will produce `0xE123` (the default base is 16). Using

```
\makebase[8]{page}
```

produces `0160443`.

Warning: this is alpha software and may contain bugs. Please report problems to the author.

2 Implementation

2.1 Packages required for the package itself

`calc` Required for calculations involving lengths or counters, such as changes to widths for margin adjustment.

```
1 \RequirePackage{calc}
```

2.2 Counters

`Sil@MB@prenum` The value of the counter before calculations start.

```
2 \newcounter{Sil@MB@prenum}
```

`Sil@MB@postnum` The value of the counter after calculations.

```
3 \newcounter{Sil@MB@postnum}
```

`Sil@MB@quot` The quotient (number of times the computed divisor goes into the current value of the counter `Sil@MB@postnum`).

```
4 \newcounter{Sil@MB@quot}
```

`Sil@MB@rem` The remainder after division.

```
5 \newcounter{Sil@MB@rem}
```

`\Sil@MB@div` The divisor (initially the base).

```
6 \newcounter{Sil@MB@div}
```

2.3 Macros

Two macros are defined: one internal for calculating the largest divisor needed to start with, and one public, for implementing the conversion.

`\Sil@MB@maxdiv` This is the internal (private) macro.

```
7 \newcommand{\Sil@MB@maxdiv}[2][16]{%
```

Record the counter value and the base (default 16)

```
8 \setcounter{Sil@MB@div}{#1}%
9 \setcounter{Sil@MB@prenum}{#2}%
10 % \message{Testing \theSil@MB@prenum\space for divisibility
11 %     by powers of \theSil@MB@div}%
```

It repeatedly divides the counter by the base using T_EX's `\divide` primitive and then re-multiplies it using `\multiply` to see if the result is zero yet, and if not, increases the base by a power and tries again.

```
12 \loop
13 %   \message{...dividing \theSil@MB@prenum\space by \theSil@MB@div}%
14   \divide\c@Sil@MB@prenum by\c@Sil@MB@div
15   \multiply\c@Sil@MB@prenum by\c@Sil@MB@div
16   \multiply\c@Sil@MB@div by#1
17   \ifnum\c@Sil@MB@prenum>0
18 \repeat
```

Because the repeating condition above cannot include anything other than the `\repeat` command, it is necessary to compute the increase of the power *before* the condition.

We therefore need to decrease it on exit to compensate, before decreasing it yet again to the previous successful level, which is the one we want to use in the actual computation as the initial divisor.

```
19 \divide\c@Sil@MB@div by#1
20 \divide\c@Sil@MB@div by#1
21 % \message{Need to start at \theSil@MB@div.}%
22 }
```

`\makebase` This is the user-level macro which performs the conversion. It too defaults to base 16.

```
23 \newcommand{\makebase}[2][16]{%
```

The first action is to call the internal macro `\Sil@MB@maxdiv` to compute the initial divisor as above.

```
24 \Sil@MB@maxdiv[#1]{#2}%
```

The prefix 0x is output if the base is 16; for base 8 the prefix is 0. These should probably be developed for other bases with an option to use T_EX's

double-quote and single-quote prefixes.

```
25 \ifnum#1=16 0x\else\ifnum#1=8 0\fi\fi
```

Set the initial values for before-and-after calculation.

```
26 \setcounter{Sil@MB@prenum}{#2}%
27 \setcounter{Sil@MB@postnum}{#2}%
28 % \message{Formatting \theSil@MB@prenum\space in base#1
29 % starting at \theSil@MB@div}%
```

Loop through the calculations. If the current divisor is bigger than the counter, output a zero and decrement the power.

```
30 \loop
31 \ifnum\c@Sil@MB@div>\c@Sil@MB@prenum
32 0\divide\c@Sil@MB@div by#1
33 % \message{skipped a power, divisor now \theSil@MB@div}%
34 \fi
```

Perform the division and record the quotient, then re-multiply the value so the remainder can be computed.

```
35 % \message{Dividing \theSil@MB@postnum\space by \theSil@MB@div}%
36 \divide\c@Sil@MB@postnum by\c@Sil@MB@div
37 % \message{...got \theSil@MB@postnum}%
38 \setcounter{Sil@MB@quot}{\value{Sil@MB@postnum}}%
39 % \message{Multiplying \theSil@MB@postnum\space by \theSil@MB@div}%
40 \multiply\c@Sil@MB@postnum by\c@Sil@MB@div
41 % \message{...got \theSil@MB@postnum, setting remainder}%
42 \setcounter{Sil@MB@rem}{\value{Sil@MB@prenum}-\value{Sil@MB@postnum}}%
43 % \message{...got \theSil@MB@rem}%
```

Output the quotient, allowing for alphabetic hexadecimal digits.

```
44 % \par\dots divided \theSil@MB@prenum\ by \theSil@MB@div\
45 % \theSil@MB@quot\ times (\theSil@MB@postnum) leaving \theSil@MB@rem:
46 \ifcase\c@Sil@MB@quot 0\or 1\or 2\or 3\or 4\or 5\or 6\or
47 7\or 8\or 9\or A\or B\or C\or D\or E\or F\else !Z\fi
```

As in the internal macro, make the resetting of the next values for the next loop *before* testing the loop condition. If the remainder is zero, exit.

```
48 \setcounter{Sil@MB@prenum}{\value{Sil@MB@rem}}%
49 \setcounter{Sil@MB@postnum}{\value{Sil@MB@rem}}%
50 \divide\c@Sil@MB@div by#1
```

```
51   \ifnum\c@Sil@MB@rem>0
52   \repeat
53 }
```

A Test of package

```
54 \documentclass{article}
55 \usepackage{makebase}
56 \setcounter{page}{"E123}
57 \renewcommand{\thepage}{\ttfamily\makebase[16]{\value{page}}}
58 \begin{document}
59 This is page number \arabic{page}.
60 \end{document}
```


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3.
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```
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%%% Copyright 2005 M. Y. Name
%%
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%% of this license or (at your option) any later version.
%% The latest version of this license is in
%%   http://www.latex-project.org/lppl.txt
%% and version 1.3 or later is part of all distributions of LaTeX
%% version 2005/12/01 or later.
%%
%% This work has the LPPL maintenance status 'maintained'.
%%
%% The Current Maintainer of this work is M. Y. Name.
%%
%% This work consists of the files pig.dtx and pig.ins
%% and the derived file pig.sty.
```

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```
%% This work consists of all files listed in manifest.txt.
```

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Change History

v0.1

General: Initial test: Rewritten
from an earlier test. 1

package with new classpack
code to create zip file to the
CTAN standard. 1

v0.2

General: Regenerated: Recreated

Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

\sqcup	44, 45		
C			
$\c@Sil@MB@div$			
.	14–16, 19, 20, 31, 32, 36, 40, 50		
$\c@Sil@MB@postnum$	36, 40		
$\c@Sil@MB@prenum$	14, 15, 17, 31		
$\c@Sil@MB@quot$	46		
$\c@Sil@MB@rem$	51		
calc (package)	<u>1</u>		
counters:			
Sil@MB@postnum	<u>3</u>		
Sil@MB@prenum	<u>2</u>		
Sil@MB@quot	<u>4</u>		
Sil@MB@rem	<u>5</u>		
D			
\documentclass	54		
\dots	44		
M			
\makebase	<u>23</u>		
\message	10,		
	13, 21, 28, 33, 35, 37, 39, 41, 43		
N			
\newcommand	7, 23		
\newcounter	2–6		
P			
packages:			
calc	<u>1</u>		
R			
\renewcommand	57		
\RequirePackage	1		
S			
$\Sil@MB@div$	<u>6</u>		
$\Sil@MB@maxdiv$	<u>7</u>		
Sil@MB@postnum (counter)	<u>3</u>		
Sil@MB@prenum (counter)	<u>2</u>		
Sil@MB@quot (counter)	<u>4</u>		
Sil@MB@rem (counter)	<u>5</u>		
T			
\thepage	57		
$\theSil@MB@div$			
...	11, 13, 21, 29, 33, 35, 39, 44		
$\theSil@MB@postnum$	35, 37, 39, 41, 45		
$\theSil@MB@prenum$	10, 13, 28, 44		
$\theSil@MB@quot$	45		
$\theSil@MB@rem$	43, 45		
\ttfamily	57		
U			
\usepackage	55		
V			
\value	38, 42, 48, 49, 57		